

Claim:

1. In a hydraulic circuit powered by a direct drive, reversible hydraulic power source having two input/output ports for introducing pumped hydraulic liquid into a volume input leg and for pumping hydraulic liquid from a volume output leg of the hydraulic circuit determined relative to the direction of hydraulic liquid flow in the hydraulic circuit, and having a hydraulic liquid reservoir,
a dual, coupled check valve improvement comprising in combination, therewith,
 - a) a manifold hydraulically coupled to the respective input/output ports of the direct drive, reversible hydraulic power source defining a translation passageway having mid-passage drain hydraulically coupled to the reservoir, where each end of the translation passageway has an angled annular valve seat opening to larger diameter plenum,
 - b) a check valve ball located within each large plenum at each end of the translation passageway,
 - c) a translating rod having a length greater and a circumferential diameter less than that of the translation passageway located in the translation passageway for preventing the respective check valve balls from simultaneously seating on the valve seats at the respective ends of the translation passage way,the hydraulic liquid pumped from one or the other ports of the reversible direct drive power source power seats the check valve ball on the particular valve seat at the end of the translation passageway in the plenum on the volume input leg of the hydraulic circuit translating the translating rod in the translation passageway preventing the check valve ball in the plenum on the volume output leg of the circuit from seating on the valve seat at the other end of the translation passageway for:
 - (i) allowing the direct drive, reversible power source to pump or make up from both the volume output leg of the hydraulic circuit and the reservoir, and

- (ii) allowing excess liquid in the volume output leg of the circuit to flow to reservoir without tripping any pressure relief valve monitoring liquid pressure in the output leg of the circuit.

2. The hydraulic circuit of claim 1 wherein the hydraulic circuit powered by the direct drive , reversible hydraulic power source comprises in combination:
- (i) a hydraulic cylinder HC having a volume on a rod side leg of the circuit per unit cylinder length is less than a volume per unit cylinder length on the blind side leg of the hydraulic circuit (because of the rod);
 - (ii) pressure relief valves relieving pressure above a set point on the blind side leg and rod side leg of the of hydraulic circuit.

3. The hydraulic circuit of claim 1 wherein the hydraulic circuit powered by the direct drive , reversible hydraulic power source comprises in combination:
- (i) a hydraulic cylinder HC having a volume on a rod side leg of the circuit per unit cylinder length is less than a volume per unit cylinder length on the blind side leg of the hydraulic circuit (because of the rod);
 - (ii) a shuttle valve containing a single check valve ball within a common plenum having a valve seat at each of its respective ends where each end of the common plenum is coupled hydraulically between one of the plenums at each end of the translation passageway of the manifold of the dual, coupled check valve,
 - (iii) a single pressure relief valve and a pressure (interrupt) switch each hydraulically coupled to a common plenum the shuttle valve for protecting against over pressurization and under pressurization in the respective rod side leg and the blind side legs of the hydraulic circuit.

4. The hydraulic circuit of claim 1 wherein the hydraulic circuit powered by the direct drive , reversible hydraulic power source comprises in combination:

- (i) includes a combination of drive coupled, driven and driving, dual hydraulic, reversible hydraulic motors where the drives are mechanically coupled for driving a winding system translating a structure such as a swimming pool cover back and forth across a swimming pool,

where, the direct drive, reversible motor pumps liquid at a constant rate into the liquid volume input leg of the hydraulic circuit for winding or unwinding the cover around a cover drum, seating the check valve ball on the valve seat in the manifold of the dual, coupled check valve at the end of the translation passageway on the liquid volume input leg plenum and unseating check valve ball valve seat 57 opposite end of the translation passageway on the liquid volume output leg plenum, and

where initially the volume input flow from the driving reversible hydraulic motor exceeds the pumping demand for liquid of the driven reversible hydraulic motor, excess flow drains to reservoir via a drain line to reservoir between hydraulically coupled input/output ports respectively of the driving and driven reversible hydraulic motors, and

where rotation of the driven reversible hydraulic motor accelerates to a point where volume liquid input demand of the driven hydraulic motor exceeds the discharge liquid volume from driving reversible motor, the driven reversible motor pumps from reservoir via the drain line to reservoir between the hydraulically coupled input/output ports respectively of the driving and driven reversible hydraulic motors, the excess output flow being available to the direct drive, reversible pump as it flows in the volume output leg of the hydraulic circuit into the manifold of the dual, coupled check valve to reservoir via the output volume plenum, and the translation passageway around the translation rod and mid-passage drain.

5. The hydraulic circuit of claim 4 and further including.
- (ii) a shuttle valve containing a single check valve ball within a common plenum having a valve seat at each of its respective ends where each end of the common plenum is coupled hydraulically between one of the plenums at each end of the translation passageway of the manifold of the dual, coupled check valve,
 - (iii) a single pressure relief valve and a pressure (interrupt) switch each hydraulically coupled to a common plenum the shuttle valve for protecting against over pressurization and under pressurization in the respective volume input and volume output legs of the hydraulic circuit.